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For the Advancement of Science

WINNIPEG

AUGUST 25th to SEPTEMBER 1st, 1909

ILLUSTRATED

BIOGRAPHICAL SKETCHES

With Notes on the Scientific Work of

The President,

The Presidents of Sections,

The Evening Lecturers

AND

The General Officers

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This series of illustrated biographical sketches is reprinted, after revision, from the Manitoba Free Press. The first of the series appeared on May 1, 1909, and the last on August 19, 1909. The series comprises sketches of the President of the Winnipeg meeting, the Presidents of the Sections, the evening Lecturers and the General Officers. In the compilation of the sketches the writer received great assistance from the Professors of the University of Manitoba, to whom he returns his thanks. He is also indebted to the Manitoba Free Press for permission to reprint the series, and for the use of the half-tone plates. Differences in the length of the sketches reflects solely the varying amounts of material at the disposal of the writer.

A. V. T.

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PROFESSOR SIR JOSEPH JOHN THOMSON, F.R.S.
President of the British Association for the Advancement of Science
WINNIPEG, 1909

PROFESSOR SIR JOSEPH JOHN THOMSON, F.R.S.

President 1909-10

In March, 1908, the council of the British Association for the Advancement of Science, announced that it had elected Professor Joseph John Thomson, Cavendish professor at Cambridge University, to be president of the meeting of the British Association in Winnipeg in 1909. The announcement has been received everywhere with satisfaction for Professor Thomson's research work in experimental physics has for years been world-famed. Professor Thomson became Cavendish professor in 1884, after this celebrated chair had been filled successively by Clerk Maxwell and Lord Rayleigh, both of them eminent physicists. Professor Thomson is known both as "The Man of Ion," and as the man "who split the atom." Through his wonderful researches into the mechanism of the conduction of electricity through gases Professor Thomson has demonstrated that the process consists of a kind of electrolysis in which opposite charged particles move in opposite directions, giving up their charges to the two electrodes. The carriers of the positive electricity have approximately the same mass as the atoms, while the mass of the carriers of the negative electricity is about one thousand times smaller. These minute, negatively charged particles have since been found to be of almost universal occurrence, and indeed to be, in all probability, the raw material of which atoms are built up. The positively charged particles on the other hand, appear to be atoms which have lost one or more of these "electrons." The atom, according to this view, consists of a number of these electrons held together and electrically neutralized by a positive charge. In any gas, in ordinary circumstances, two opposite processes are going on. Atoms are parting with electrons, or "ionising" as it is called, while at the same time the positive and negative ions thus formed collide from time to time and re-combine. The result of these opposite processes is that a balance is soon reached between them, after which the number of free ions in each unit volume of the gas remains constant.

Professor Thomson has shown, too, that the pencil of rays coming from the cathode during the passage of an electric discharge in an exhausted tube consists of a stream of these small electrons. This conclusion was contested for some time, especially in Germany, but it has now been shown to be a true account of the phenomenon. For, in spite of the minute size of these electrons, Professor Thomson was able to determine their mass, the magnitude of the electric charge which they carry and the speed with which they move.

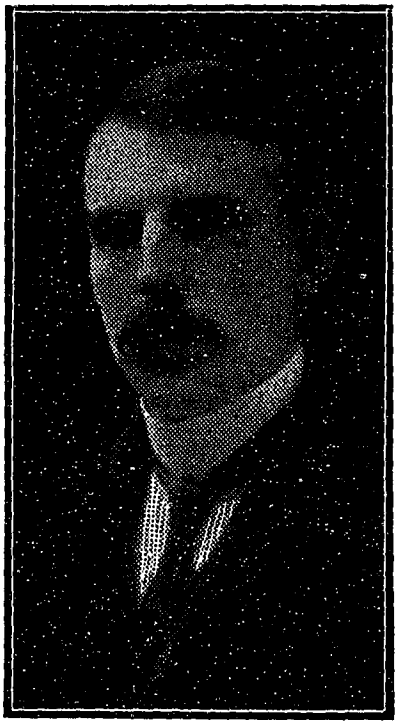
The professor's labors have contributed perhaps more towards establishing physics and chemistry on a new basis than those of any other inquirer. When radium was discovered by Madame Curie and her ill-fated husband, Professor Thomson's theories received remarkable support. The Beta rays of radium were found to be composed of electrons having a mass apparently greater than that of the slower radium electrons. Professor Thomson calculated the mass which ought to correspond to the different velocities on the assumption that the mass of the electrons was entirely of this electrical nature, and the observed values agreed with the calculated ones with an accuracy quite surprising.

Professor Thomson was born near Manchester on Dec. 18, 1856, and he married in 1890 Miss Rose Elizabeth Paget, a daughter of the late Sir George E. Paget, K.C.B. In 1906 he received the Nobel prize for physics. Science possesses few personalities more striking and attractive than that of Professor Thomson. His enthusiasm is infectious and his unbounded energy impresses all who come into contact with him. He lectures to his advanced class, making scientific history as he goes; he lectures to his elementary class on the properties of matter, giving it a liberal education. He does the thinking for his own researches and is always ready to do some more for the twenty or thirty men whose work he supervises; yet in spite of it all he has more time for other interests than most men. How he does it is a mystery. When he sleeps, or indeed, whether he ever does sleep, his students cannot say, but the fact remains that in recent fiction, in the drama, in sport, and in politics, he is abreast of the times and ready to be entertaining or entertained on one or other of these topics.

PROFESSOR ERNEST RUTHERFORD, F.R.S.

President of Section A.—Mathematical and Physical Science

Once again the story that has to be told is that of a young man. Perhaps the most remarkable thing about Professor Rutherford, who, by the way, needs no introduction to Canadians, is the fact that he is still in the thirties. He was born in 1871 at Nelson, New Zealand. Few, if any, living men have



accomplished so much in so short a time. Professor Rutherford was Macdonald professor of physics at McGill University, Montreal, from 1898-1907. It was during this period that much of the work for which he is famous was accomplished. In turn, a large portion of this work was performed during the Canadian winter. Professor Rutherford told the writer a little over a year ago that the stimulus of the returning winters in Montreal had been responsible for much of his work. It is highly satisfactory, in view of the uncomplimentary things which used to be said about the Canadian winter, to reflect that it promoted the labors of one of the greatest of living scientists. Since 1907 Professor Rutherford has been Langworthy Professor and director of physics at the University of Manchester. Here, he has among his colleagues Professor Dixon, who will deliver a free popular lecture at the Winnipeg meeting of the Association, and Professor S. J. Chapman, who has been elected president, for the Winnipeg meeting of section F., Economic Science and Statistics.

Winning the 1851 Exhibition Science scholarship in 1894 Professor Rutherford proceeded to Cambridge, entering Trinity College, and from 1895 to 1898 he was engaged there at research work in the famous Cavendish laboratory as the pupil of Professor Sir J. J. Thomson, president elect of the Winnipeg meeting. His work at the Cavendish laboratory was of such a nature that after the discovery of radium by Madame Curie and her late husband in Paris, in 1898, Professor Rutherford was splendidly equipped to study the properties of that remarkable substance. For three years, under Professor Thomson, he had been studying the measurement of radio-active phenomena, and it was precisely this training which was invaluable for research work on radium. He began the latter work at McGill University, and for three years or more he and his pupils published a paper at least every month on the properties of radium and allied substances. This extraordinary activity and the intrinsic value of the results he obtained stamped him at once as one of the rising men of science of the twentieth century. His chief work was the description of a highly curious gas-like substance given off spontaneously by radium. As he was not fully persuaded that this substance was a gas, he called it "The Radium Emanation," a name which it still retains.

The striking nature of this description is the more evident when it is remembered that the amount of radium in Professor Rutherford's possession was not as large as a pin's head and the volume of gas given off by it, in a considerable length of time, would not have filled one of the indentations on the outside of an ordinary thimble. He was greatly in doubt whether this substance had the properties of a gas and he exhausted all the means at his disposal in the attempt to gain absolute proof. But he still remained in some doubt. Finally, through the generosity of Sir William Macdonald an expensive plant for the purpose of liquefying air was obtained. The intense cold

obtainable by this plant did what Professor Rutherford expected it would do: it caused the radium emanation to become a liquid, thus proving its gaseous nature. The only possible way of describing such an extremely minute quantity of gas was by means of the enormous quantity of energy which it contained. The emanation of radium is now known to possess about 3,000,000 times as much energy as the same mass of coal: that is to say, one ton of this emanation, if it could be obtained, would spontaneously produce as much energy as 3,000,000 tons of coal. For this splendid discovery Professor Rutherford was, in 1895, awarded the Rumford medal of the Royal Society of London.

Radium is known to emit spontaneously three kinds of rays, called by Professor Rumford the alpha, beta and gamma rays. The alpha rays are particles of matter charged with positive electricity. The beta rays are particles of matter charged with negative electricity and the gamma rays are the famous X-rays. Many experiments have been performed by Professor Rutherford on the properties of these rays. Quite recently he has apparently shown that the alpha particle, without its charge of electricity, is simply an atom of helium. Helium, however, was discovered some time before radium was known, and it has, by the way, its own romantic history. Professor Rutherford has shown that the atom of radium is spontaneously flying to pieces and that some of these pieces form the element helium, that is to say, one element produces another. This is none other than the old theory of the alchemists, viz., the transmutation of metals, which they sought to obtain by means of the philosopher's stone, but which is actually accomplished by radium.

Very many of the minor properties of radium and its products have been investigated by Professor Rutherford and he is now busy trying to discover the origin of radium itself, an origin at present wrapped in mystery. The work which he and other brilliant investigators have done in connection with radio-activity is now so extensive that it would fill a large volume. No one knows how much more remains to be discovered. It is, however, quite certain that the work done by Professor Rutherford and others on radio-activity will occupy a prominent place in the scientific achievements of the twentieth century. The brilliance of Professor Rutherford's work has been recognized by the medals and prizes of scientific societies, by the honorary degrees of universities and lastly by the famous Nobel prize of $40,000, which he received at Christmas, 1908. In 1905 he delivered the Silliman lectures at Yale University. The fact that he is still a young man augurs well for the investigations he will conduct in the future. The address which he will deliver in Winnipeg as president of Section A, is anticipated with keenest interest by all interested in the advancement of science.

PROFESSOR HENRY EDWARD ARMSTRONG, F.R.S.

President of Section B.—Chemistry

Professor Armstrong has had a long and distinguished connection with the British Association. He is one of the old guard. As far back as the Aberdeen meeting of 1885 Professor Armstrong presided over the Chemistry section, and going further back still he is

found as one of the secretaries of the section at the Bradford meeting of 1873. But it is not only as a great chemist that Prof. Armstrong is famous; he is also a noted and virile educationalist. In fact he was mainly instrumental in founding the section of Educational Science at the Glasgow meeting of 1901. The following year, at the Belfast meeting, he presided over the newly-formed section. His address on that occasion was notable for its strong originality and for its practical common sense. In a careful examination of the fundamentals of education he dwelt on the oneness of all knowledge and on the inherent disadvantages of specialization. Prof. Armstrong's utterances at the meetings of the British Association, invariably command attention. He is a lion of debate and a free and forceful speaker. He has added much spice to the proceedings.

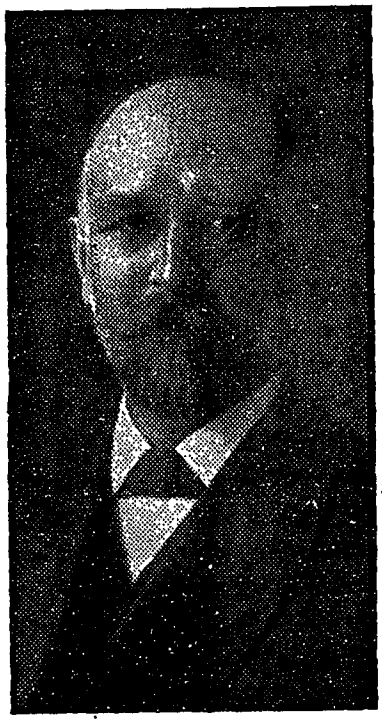
Tht heuristic method of teaching has found in Prof. Armstrong a vigorous advocate. He insists, for instance, that students make their own experiments and draw therefrom their own deductions. He has accomplished wonders in getting his own ideas with regard to the teaching of science put into actual practice. It is not too much to say that during the past twenty years an absolute revolution in the use of science in education and in the specific teaching of science, has been wrought in Great Britain. For this, through his persistent, strenuous teaching, Prof. Armstrong is largely responsible. He has an extraordinarily strong and devoted following among teachers of all grades in the old country.

Since 1885, or for nearly a quarter of a century, Prof. Armstrong has been professor of chemistry in the City and Guilds of London Central Institute, South Kensington. His researches have been chiefly in the naphthalene derivatives, an important group of coal-tar colors. He has also enunciated a theory of solutions, which, however is not accepted by many eminent chemists. His services to chemistry have been recognized, among other ways, by election to the presidency of the Chemical Society of London in 1894 and 1985 He was secretary of the Society in 1875 and 1893. Prof. Armstrong is a member of the committee which has charge of the famous Agricultural Experiment station established at Rothamstead by Sir John Lawes. The Professor is also an author of note. His work, "The Teaching of Scientific Method" is a volume of masterly essays on educational topics. He has also published numerous papers descriptive of his research work. These cover a remarkably wide range and embrace organic inorganic and physical chemistry.

DR. ARTHUR SMITH WOODWARD, F.R.S.

President of Section C.—Geology

It was shown in the sketch of Col. Prain that merely to describe a man as a botanist, was not, scientifically speaking, saying very much about him. There are sciences within sciences. Dr. A. S. Woodward, who will preside over the Geological section of the Winnipeg meeting, is a distinguished



paleontologist. This name is given to geologists who concern themselves with the fauna of former ages as revealed by rock fossils. To this branch of geologic investigation much attention has been given in recent times, with the result that the sum of scientific knowledge has been greatly increased. The astronomical relations of the earth and their bearings on geological speculation have also been much discussed in recent years, more particularly the origin of climates in the past and the still baffling question of the age of the earth.

Dr. Woodward has been connected for over a quarter of a century with the British Museum, the most famous museum in the world. Born at Macclesfield in 1864 he was educated at the grammar school of his native town and proceeded thence to Owen's College, Manchester, now the University of Manchester. At the age of 18 he entered the British Museum as assistant curator of the geological collection, assuming full charge of the department in 1901. The geological, and other natural history collections, were removed some years ago from the historic building in Bloomsbury for reasons of space and deposited in the magnificent natural history museum, in Cromwell road, South Kensington. Within the walls of this far-famed museum are a large number of priceless objects. It has long been one of the show places of London. To this museum Andrew Carnegie recently presented a cast of the great diplodocus. This formed an acceptable addition to the existing very fine collection of fossil reptiles; monsters which in past geologic periods inhabited the land, the sea and the air.

Dr. Woodward is an authority on extinct vertebrata, having occupied himself mainly with the fossil remains of fishes. He has travelled extensively in South America, which he visited in 1896 and again in 1907. On that continent he undertook a large amount of research work and has devoted much study to its extinct vertebrata. In 1901 he conducted a series of excavations in Greece for the trustees of the British Museum and obtained a collection of fossil bones from Pickermi, near Athens. The same year Dr. Woodward experienced the honor of being elected a fellow of the Royal Society. The Geological Society of London, one of the most distinguished of its kind in existence, voted him the Wollaston fund for original research in 1889 and in 1896 he gained the Lyell medal of the same society. Among the many learned societies of which Dr. Woodward is a member may be mentioned the Belgian Geological Society, the New York Academy of Science and the Boston Society of Natural History. A monument of his work is the catalogue of the fossil fishes in the British Museum, consisting of four volumes. He has published "Outlines of Vertebrate Paleontology," and has written memoirs for the geological survey of New South Wales and the La Plata Museum. To periodic scientific literature Dr. Woodward has been a prolific contributor.

Through his work in comparative paleontology Dr. Woodward has added considerably to the present knowledge of the subject. As already mentioned his work has lain mainly in the study of the fossil remains of vertebrates to

be found in stratified rocks. These remains have appeared in greatest abundance in the geological system known as the age of fishes. A recent discovery in paleontology is the evolution of the elephant and the whale, which for years had been a source of much speculation among scientific men. The evolution of the horse and of the chief ruminants was already known and had been worked out in great detail from a large number of intermediate links between successive types found in the rocks of North America. From these fossils scientists were able to satisfy themselves that the horse wandered from North America to South America and Europe. A remarkable thing about the history of the horse is that it became extinct in both North and South America, this happening only a comparatively short time ago. The aborigines of North America were familiar with the horse, but the genus had died out before a European arrived. Very much the same thing happened in the case of camels and llamas. Evolved in North America the camel and the llama migrated to South America, where the llama persisted and the camel became extinct. The ancestor of the camel, however migrated to Asia and Africa and persisted there.

It may not be out of place to mention here that great strides have been made during the last half century in the geological survey of Canada. The latter was first provided for and organized in 1842, field work beginning the following year. The present organization and system of work has thus been evolved out of an experience of 67 years, and in addition to this experience the officers of the Canadian survey have had a full knowledge of the methods practiced by similar surveys in other countries, and have always been ready to consider any suggestion or new departure which might be of service. Previous to Confederation the operations of the geological survey were confined to what are now the provinces of Ontario and Quebec. Since Confederation, however, the attention of the department has been directed not only to all the nine provinces of the Dominion, but to the whole of the former domain of the Hudson's Bay Company, to the Labrador peninsula and all the islands lying northward of the mainland of North America.

A splendid tribute to the efficiency of the Canadian Geological Survey is to be found in the records of the British Association itself. In his presidential speech to the Geographical section at the Belfast meeting in 1902. Colonel Sir T. H. Holdich said, in part: "In Canada and North America we have perhaps a practical exposition of the art of geographical surveying, which is as unequalled in completeness and comprehensiveness as the country with which it has to deal is unequalled as a subject for its application. . . . . The Canadian geological survey is their geological survey, and I think that it is to Canada (if not to India) that we owe the first recognition of the fact that geographical surveying is a separate, distinct, and most important branch of the general art—from which all other surveys should spring. . . . . Neither Canadians nor Australians wait for England to show them how to develop the resources of their own country, or pilot the road to new ventures. On the contrary, we have to turn to Canada now for instruction in the higher art of geographical map making, and to admit that England has been left far behind in the development of the special branch of science which deals with the illustration of the main features of geographical configuration in relation to their geographical construction."

It would be an unpardonable omission not to mention here that the only Canadian who ever occupied the presidential chair of the British Association was the great geologist Sir John William Dawson, one time principal and vice-chancellor of McGill University. The theme of his address delivered to the Association at Birmingham in 1886 was the geological history of the depression of the North Atlantic and its relation to the continental masses which limit it. Other great geologists who have occupied the presidential chair are: Sir Charles Lyell, John Phillips and Sir Archibald Geikie.

PROFESSOR ARTHUR EVERETT SHIPLEY, F.R.S.

President of Section D.—Zoology

With the wide extension of scientific discovery and investigation the British Association for the Advancement of Science has for many years past been obliged to divide its work into sections. Each section has at its head a president, whose address to his section is one of the features of the British

Association's meetings. In having as its president for the Winnipeg meeting Professor Shipley, of Cambridge University, the Zoological section is extremely fortunate, for the professor ranks as one of the ablest biologists of the day and his address to the section will undoubtedly be a notable utterance. But Professor Shipley, in presiding over the Zoological section, will have around him the wraiths of many famous men, who, in the years gone by, have made the section memorable and illustrious. Before it in the sixties Thomas Huxley, the champion of Charles Darwin, defended the theory of evolution in the face of heated and violent opposition. At the Oxford meeting of 1860, for ever famous, Bishop Samuel Wilberforce, in an unfortunate moment, asked whether Professor Huxley was related on his grandfather's or his grandmother's side to an ape. In a historic retort, and one which is still frequently quoted, Professor Huxley scored heavily off the Bishop. He said:—"I asserted, and I repeat, that a man has no reason to be ashamed of having an ape for his grandfather. If there were an ancestor whom I should feel ashamed in recalling, it would be a man, a man of restless and versatile intellect, who, not content with an equivocal success in his own sphere of activity, plunges into scientific questions with which he has no real acquaintance, only to obscure them by an aimless rhetoric, and distract the attention of his hearers from the real point at issue by eloquent digressions, and skilled appeals to religious prejudice."

How Darwin himself found solace may be gathered from the following passage:—"The astonishment which I felt on first seeing a party of Fuegians on a wild and broken shore will never be forgotten by me, for the reflection at once rushed into my mind —'such were our ancestors.' These men were absolutely naked and bedaubed with paint, their long hair was tangled, their mouths frothed with excitement and their expression was wild, startled and distressful. They possessed hardly any arts and looked like wild animals, lived on what they could catch. They had no government and were merciless to anyone not of their small tribe . . . . for my part I would as soon be descended from that heroic little monkey who braved his dreaded enemy in order to save the life of his keeper . . . . as from a savage who delights to torture his enemies, offers up bloody sacrifices, practices infanticide without remorse, treats his wives like slaves, knows no decency, and is haunted by the grossest superstitions."

Professor Shipley is one of a brilliant band of original investigators who have made the University of Cambridge and the morphological laboratories on the banks of the Cam, one of the principal biological centres in the world. He is a representative of the Balfour school of biology, so-called from Professor Francis Maitland Balfour, the late brother of ex-Premier Arthur James Balfour. Professor Balfour, who met his death through a

climbing accident amid the Swiss peaks, is claimed by many to be the first and greatest of the modern school of biologists. He emphasized the study of phylogeny or animal development. His two volumes on "Comparative Embryology" have been translated into all the principal languages of the world. They form a standard work in the science of organic development, which declares that the changes undergone by a young animal, from the germ onward, reveal the ancestral story of that animal in the distant past. The frog, from the egg to the adult, passes, so it is held, through a worm-like condition and later through a fish-like condition known as the pollywog. These changes are held to show that the frogs were ages ago really fishes instead of air-breathing amphibians and that still earlier they belonged to the worm family. Man, according to this school of biologists, is held to show ape-like features in the earliest stages of babyhood. Many people, of course, do not accept this theory. William Jennings Bryan, speaking recently in Winnipeg, repudiated this ancestry as far as his own family was concerned.

Born in 1861 Professor Shipley is the second son of the late Alexander Shipley, of the Hall, Datchet, Buckinghamshire. From his earliest student days he has practically lived in the academic buildings of Cambridge. He spent some time, however, at Freiburg University and at the Stazione Zoologica, Naples. By a happy coincidence he became a student at Christ's College, where Charles Darwin studied, or refused to study, as he honestly confessed. Of the College of Darwin and of John Mliton, Professor Shipley has become one of the most distinguished members and has risen to be a leading Cambridge "don." His lectures attract the best biological students. He is, however, not the typical, stiff, stately and stoical "don," but a hearty, genial, good fellow, and a favorite everywhere. Workers at Naples for over a quarter of a century have heard of Arthur Everett Shipley from Dr. Anton Dohrn, the brilliant chief director of the station there.

Apart from fishes Prof. Shipley has made discoveries in the study of other families of animals, especially the Invertebrata. His splendid results appeared in the transactions of various British and foreign learned societies. It was inevitable that the Royal Society the Invertebrates in 1898, the best of its kind, and more recently collaborated with Professor McBride, of McGill University, Montreal, in a splendid work on zoology for use in the universities. He did some invaluable work in the study of nerves, especially the cranial nerves, which have long been a problem to scientists. The famous results of Prof. W. H. Gaskell in inshould take him into its ranks, and that at an unusually early age. He published a remarkable text book on vestigating the paired nerves, were first aided greatly by Dr. Shipley's pioneer investigations. It is thought that these neural studies inform us as to the origin of man. Many will be surprised to learn that man's remote ancestor was probably not an ape, but a spider, scientifically called an Arachnid!

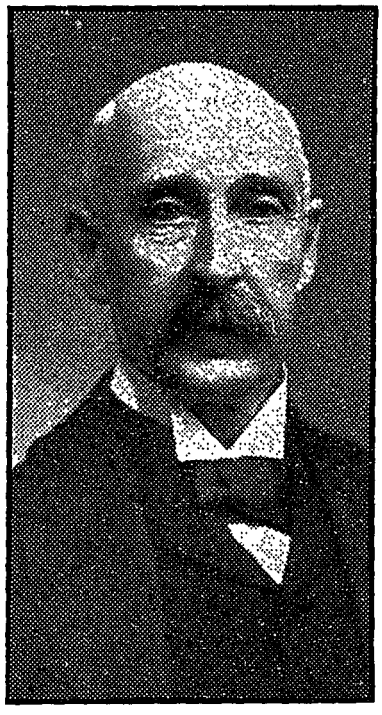
Dr. Shipley and his biological confreres on their visit to Canada, will be specially interested in the fine scientific stations founded recently by the Dominion Government, and under the direction of Prof. Prince, the commissioner of fisheries. The three stations at St. Andrew's, N.B., Departure Bay, opposite Vancouver City, B.C., and at Parry Sound, on the Great Lakes, will excite interest and admiration. The last station founded at Departure Bay, Vancouver Island, is said to have adjacent to it the most wonderful assemblage of marine life in the world. New fishes, new mollusks, and new crustaceans have been discovered there year after year, and it is here that United States museums have got some of their richest treasures. This marine station is now carrying on its work under the distinguished zoologist, Rev. George W Taylor, F.R.S.C.

It must be added that Prof. Shipley is an accomplished popular writer. Among his many articles in periodical literature was one on the scientific view of "Death" in the "Nineteenth Century," nearly twenty years ago. He maintained that living things possessed immortality or an undying constituent, which passed on from generation to generation. His views were so original that they attracted very wide public attention, and they embodied much that was due to the great German biologist, August Weissman. Taking Prof. Shipley all round, he is a typical cultured and original Englishman, open, genial, modest and possessed of a refined, attractive personality.

COLONEL SIR DUNCAN ALEXANDER JOHNSTON, K.C.M.G.

President of Section E.—Geography

In Colonel Sir Duncan Johnston the Geographical section of the British Association has, for its president, a geographer of note. The colonel is 62 years of age, 36 of which have been spent in the Royal Engineers. His father, Henry Johnston, was a surgeon in the service of the East India Company, which accounts for Sir Duncan



having spent a portion of his life in India. After studying at Trinity College, Glenalmond, Sir Duncan, then a young man of 21 years of age, entered the Royal Engineers. He became a captain in 1879, a major in 1887, a lieutenant-colonel in 1894, a brevet-colonel in 1898 and a colonel in 1899. He retired in 1904 and lives now at Eastbourne on the south coast of England.

The fact that Colonel Johnston was from 1899-1905 director-general of the ordnance survey of the United Kingdom is sufficient to proclaim him a master of the scientific basis of geography. The ordnance survey of the old country is an important department of the board of agriculture and fisheries. Although transferred from the army funds to civil votes by the Survey Act of 1870, the survey has always been arranged upon a military basis and carried out by officers selected from the Royal Engineers. Much excellent work has been accomplished by the survey. Maps of the whole of Great Britain have been published on the scale of 25 inches to the mile, for cultivated districts, six inch to the mile and one inch to the mile, and of Ireland on the six inch and one inch scales. A revision of the survey of Great Britain and the re-survey of Ireland on the 25 inch scale are in progress at the present time.

Sir Duncan Johnston's services to geographical science were recognized by his election to the vice-presidency of the Royal Geographical Society in 1905, which was followed two years later by his election to the honorary secretaryship of the same historic society. The Royal Geographical Society, now housed in Savile Row, London, was founded in 1830. Its three medals, awarded annually to distinguished geographers, are much coveted. The Society contributes to the maintenance of schools of geography at Oxford and Cambridge Universities. It subsidises exploring expeditions and gives instruction to, and lends instruments to, travellers in various parts of the world. It is largely through the society's stimulus that geographical studies are receiving increased attention in the United Kingdom. Last year new lectureships in geography were established in Edinburgh, Glasgow and Sheffield.

In 1905 Sir Duncan Johnston was appointed by the Conservative Government of the day to the chairmanship of a committee instructed to collect information with regard to the redistribution of the electoral areas in parliamentary elections. He was also a member of the commission appointed in 1906 to inquire into the future constitution of the Transvaal and Orange River Colonies and in the same year he was appointed chairman of the Transvaal Electoral Commission. Sir Duncan is a member of the Royal Geological Society. He was created a Companion of the Bath in 1903 and in 1906 he was knighted as a Knight Commander of the Order of St. Michael and St. George. In 1883 he married Clare Millicent Mackenzie and has one son.

PROFESSOR SYDNEY JOHN CHAPMAN, M.A.

President of Section F. Economic Science and Statistics.

Although political economy has been called the dismal science it is probable that the proceedings of the section over which Professor Chapman will preside will be, on the whole, more lively than those of the other sections. Educated in Manchester, and now occupying the chair of political economy at

the University of Manchester, it is not surprising that Professor Chapman is a strong free-trader. For Manchester believes in free-trade as staunchly as Winnipeggers believe in the merits of No. 1 Hard. But the free-traders will by no means have the section to themselves. Many ardent tariff reformers from the Old Country will attend.

Many distinguished men have presided over this section, among them being Sir Stafford Northcote (afterwards the Earl of Iddesleigh); Prof. Stanley Jevons, Prof. Henry Fawcett, the blind postmaster-general and father of Philippa Fawcett, who was placed above the senior wrangler at Cambridge, but was not allowed to rank owing to her sex; Right Hon. W. E. Forster, Prof. H. Sidgwick, Robert (now Sir Robert) Giffen, Prof. A. Marshall and Leonard (now Lord) Courtney. Both at Montreal in 1884 and at Toronto in 1897, a number of papers were read before the section on Canadian subjects.

Professor Chapman was born in Wells, Norfolk, in 1871, and is thus another of the young scientists who are being honored by presidential chairs at the Winnipeg meeting. He was educated at the Manchester Grammar School, at Owen's College, Manchester, and at Trinity College, Cambridge. At Cambridge, as incidents of a brilliant academic career, he gained the Cobden and Adam Smith prizes and later on was Jevons' research student at Owen's College, Manchester. From 1899-1901 he lectured on economics at Cardiff College and it was there that he met Mrs. Chapman, who was at that time a medical student in the same seat of learning. In 1901 Prof. Chapman assumed the chair of political economy at Owen's College, Manchester, now the University of Manchester, and has remained there ever since. In 1904 he became the dean of the faculty of commerce and administration. It may be noted here that although political economy as a science may be said to date from Adam Smith, it is in comparatively recent years that chairs have been founded at universities for the promotion of this study.

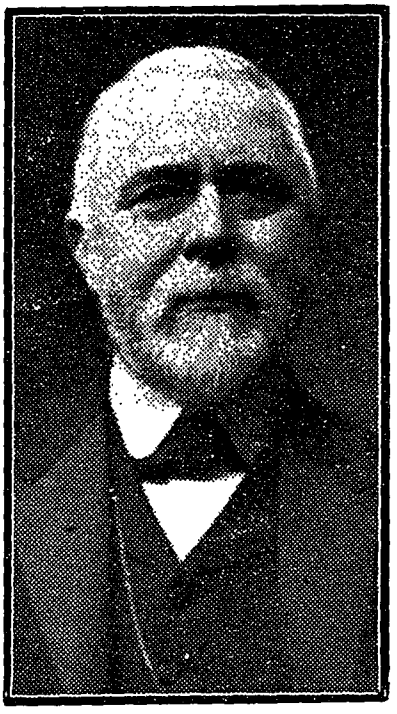
On several occasions Prof. Chapman has acted as examiner in economic science at Cambridge, London, and other old-country universities. In 1907 he was made a member of the advisory committee of the census of production. Many economic treatises have come from his pen. He has contributed a couple of volumes to Lord Brassey's series on "Work and Wages," and he has written voluminously on the Lancashire cotton trade. It would be a distinct omission not to mention that Professor Chapman is a strong advocate of woman's suffrage. More than once during the past few months he has appeared on public platforms in support of the cause and he is a member of the men's league formed to advocate votes for women. Between his studies he gets in a good deal of lawn tennis, cycling, golf, gardening and sketching. He is a genial and kind-hearted fellow, a brilliant scholar and a great walker.

For many years past Prof. Chapman has been a member of the British Association. In 1901 he became one of the secretaries of the section of economic science and statistics, and has held the position ever since with the exception of the year 1905 when the Association met in South Africa.

SIR WILLIAM HENRY WHITE, K.C.B.

President of Section G.—Engineering

When it is stated that Sir William White was director of naval construction and assistant controller of the Royal Navy of Great Britain and Ireland from October, 1885, to February, 1902, a period of nearly 17 years; and when it is stated further that during that period Sir William White design-



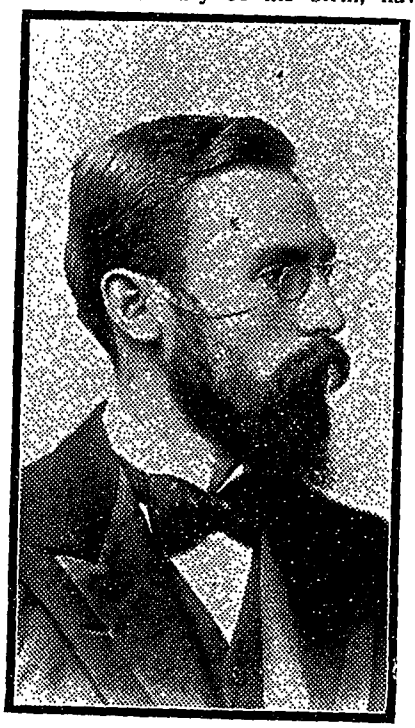
ed 200 war vessels of various types, costing something like $500,000,000, his claim to be included in the list of Winnipeg's distinguished visitors for the British Association will not be disputed. In view of the liveness of the subject, citizens of Winnipeg will be pleased to learn that the title of Sir William's presidential address to the section of Engineering is to be: "The Sea Communications of the Empire with Special Reference to Their Protection by the Government in Time of War."

Sir William White was born in Devonport on Feb. 2, 1845, and was the youngest child of the family. At the age of fourteen he became an apprentice in the famous dockyard of his native town. His latent ability was not long in asserting itself, for in 1864 he took the first place in the scholarship competition at the Royal School of Naval Architecture, which had then just been established by the British Admiralty at South Kensington, and in 1867 he gained his diploma as fellow of the school with first class honors. At once joining the constructive staff of the Admiralty young White acted as confidential assistant to the chief constructor, Sir Edward Reed, until the latter's retirement, in 1870. The loss of the "Captain" in that year was followed by an inquiry into designs for ships of war, and in connection with this White, together with his old fellow student, William John, worked out a long series of calculations as to the stability and strength of vessels, the results of which are published in an important paper read in 1871 before the Institution of Naval Architects. In 1872 White was appointed secretary to the council of construction at the Admiralty, in 1875 assistant constructor and in 1881 chief constructor. In April, 1883, he left the service of the Admiralty at the invitation of Lord (then Sir W. G.) Armstrong, in order to undertake the difficult task of organizing a department for the construction of warships of the largest size at the Elswick works. However, he only remained there for two and a half years, for in October, 1885, he returned to the Admiralty in succession to Sir Nathaniel Barnaby, as director of naval construction, retaining that post until the beginning of 1902, when ill-health obliged him to relinquish the arduous labors it entailed. During that period, which in Great Britain was one of unprecedented activity in naval building, more than 200 vessels of various types were added to the British Navy at a total cost of about $500,000,000, and for the design of these, as well as for the work of their construction, Sir William White was ultimately responsible. He was professor of naval architecture at the Royal School of Naval Architecture from 1870 to 1873, and when in the latter year it was removed to Greenwich, to be merged in the Royal Naval College, he reorganized the course of instruction and acted as professor for eight years more. The lectures which he gave in that capacity were the foundation of his "Manual of Naval Architecture," which has been translated into several foreign languages and is recognized as a standard text book all over the world.

PROFESSOR JOHN LINTON MYRES, F.S.A.

President of Section H.—Anthropology

Professor John Linton Myres, who has been appointed president of the Anthropological section, is another of the brilliant young scientists of Great Britain who are coming to Winnipeg. A few weeks ago he celebrated the fortieth anniversary of his birth, having been born at Preston, Lancashire, in 1869. Since 1907 Professor Myres has been Gladstone professor of Greek and lecturer in Ancient Geography at the University of Liverpool. He has had a lengthy connection with the Anthropological section. In 1893, at the Nottingham meeting, he became one of the secretaries of the section and has filled the position practically ever since. His services to the section are now being recognized by elevation to the presidency.



Professor Myres' chief contribution to science is the research work undertaken by him in Crete and Cyprus. Few men know more about the historic Island of Cyprus than he does, a fact which no doubt accounts for his initials being beneath the article on Cyprus in the latest edition of the Encyclopedia Britannica. In 1894, Professor Myres undertook a series of important excavations in Cyprus and reorganized the local museum on behalf of the British Government, to whom it now belongs. It was founded, however, in 1883, by private enterprise. On its behalf Dr. Max Ohnefalsch-Richter, who had already made trial diggings on the island for the British Museum at South Kensington, excavated the sancturaries of Voni and Kythrea and also opened tombs on several sites. This work was followed in the next few years by further finds and led to the foundation of a Cyprus exploration fund, which permitted a series of research expeditions to be undertaken. In connection with this fund the sanctuary of Aphrodite, at Paphos, was excavated in 1888, more tombs were opened at Poli in 1889-90, and in 1890-91 extensive trials were made at Salamis. Finally in 1894 Professor Myres expended the balance of the fund to settle special points at Agia, Paraskevi, Kalopsida and Larnaca. In 1899, in collaboration with Dr. Ohnefalsch-Richter, Prof. Myres published a catalogue of the Cyprus Museum, which formed an authoritative record of archeological research in Cyprus up to that date.

The professor has also taken part in recent expeditions in the Island of Crete, which he visited in 1893, 1895, 1898 and 1903.

Both at school and college Professor Myres had a distinguished career. After gaining a scholarship at Winchester School, he gained a further one which took him to New College, Oxford. He was a fellow of Magdalen College, Oxford, from 1892-5, and Craven travelling fellow from 1892-4. In 1899 he was Arnold essayist and became lecturer in Classical Archaeology at Oxford in 1903. Professor Myres was junior proctor at Oxford in 1904-5, secretary to the committee for anthropology from 1905-7, and public examiner in the final classical school from 1906-8. He was secretary of the Anthropological Institute of Great Britain and Ireland from 1900-03, and honorary secretary of the Liverpool committee for excavating and research in Wales and the Marches in 1908. He has written a history of Rome and published a large number of scientific papers.

PROFESSOR ERNEST HENRY STARLING, F.R.S.

President of Section I.—Physiology

At the Winnipeg meeting of the British Association the younger men of the scientific world will be well to the fore. The city will have the opportunity of seeing and hearing many young scientists who for years to come will be in the van of scientific progress. Prof. Starling, the subject of the present sketch, is one of the younger Brit-

ish physiologists, and although he is only 43 years of age, he is a recognized leader in his department. Physiological students the world over are familiar with the name of Prof. Starling, for he has written one of the most popular text books upon the subject.

Prof. Starling has been for the past ten years professor of physiology at University College, London. During this period he has been carrying on physiological research and has given to the world results of investigations which have to a considerable extent modified scientific theory with regard to the human body. The physiology of the heart and the circulation of the blood has been his special province. Much of his work has been carried out in conjunction with his assistant, Prof. W. M. Bayliss, F.R.S. Perhaps the most important discovery of these joint investigators has been the chemical mechanism of the secretion of the pancreatic juice. This discovery revolutionized existing notions as to many of the processes of the body. The theory put forward by Prof. Starling and Prof. Bayliss has tended distinctly to the dethronement of the nervous system and has substituted therefor the operation of chemical processes in the control of many secretions and other bodily activities. In fact, it appears that definite chemical substances, or to speak more properly, drugs, are being manufactured by different tissues in the body in order to aid the specific activities of these tissues or of kindred tissues or organs. These chemical messengers Prof. Starling has called "Hormones." Thus it seems that the habit of drugging is not so unnatural as at first sight might appear. In other words the body is, in fact, naturally and constantly drugging itself as a normal physiological process.

A distinguished student career began with Prof. Starling's entry in 1882 into the historic Guy's Hospital, London, where the young physiologist obtained gold medals in several subjects. After obtaining the degree of Doctor of Medicine of London University and becoming a fellow of the Royal College of Physicians, Prof. Starling spent some time in research work at Heidelberg University. Later on he became lecturer in physiology in Guy's Hospital and also lecturer at the London School of Medicine for Women. On the appointment of Prof. Schaefer to the professorship of physiology at Edinburgh University, Prof. Starling succeeded him in the chair of physiology at University College, London, and he has occupied this chair ever since. Simultaneously Prof. Starling has received many distinctions. In three different years he has been Arris and Gale lecturer to the Royal College of Surgeons; he was also Croonian lecturer of the Royal Society in 1904; Croonian lecturer of the Royal College of Physicians in 1905; Baly medallist in 1907, and Herter lecturer, New York, in 1908. Prof. Starling has contributed articles to various journals on many different branches of physiology. His earlier work was upon the lymph, urinary secretion and muscular mechanisms of the alimentary canal. Many of these subjects he worked up into articles for Prof. Schaefer's large text book. He is the translator of Metchnikoff's Comparative Physiology of Inflammation and he has edited the works of the late Dr. Wooldridge.

LIEUTENANT-COLONEL DAVID PRAIN, F.R.S.

President of Section K.—Botany

A visit to the Royal Botanic Gardens, Kew, England's historic national park, should be undertaken by those who wish to know something of Colonel Prain. In 1905 he became director of the Gardens and holds the position at the present time. Upon him

has thus fallen the mantle of two great English botanists, father and son, Sir William Jackson Hooker and Sir Joseph Dalton Hooker, who were at the head of affairs at Kew for 44 years. A word as to these two eminent scientists will, perhaps, permit of a clearer appreciation of the work of Colonel Prain. Sir William Jackson Hooker became director of Kew Gardens in 1841. The famous pleasaunce consisted at that time of 11 acres, but under Sir William Hooker it was extended to 45 acres, in addition to which a park of 240 acres was added. Ten old conservatories were replaced by twenty-five larger ones of modern construction, and in conjunction with Professor Henslow Sir William founded the most complete museum of botany in the world. By his enormous correspondence with, and ready aid to, botanists throughout the world, Kew Gardens became the distributing point of hundreds of useful plants, which sent there in collections, were shipped to British Colonies and foreign countries for testing. Through Sir William Hooker's efforts Great Britain largely extended her commerce in the products of the soil. While performing his official duties he was, at the same time, collecting for his private herbarium and also writing books on botany, which at the time of his death, numbered about 100 volumes. His herbarium was purchased by the nation after his death.

Sir Joseph Dalton Hooker, who is still living and over 92 years of age, assisted his father in the directorship of Kew Gardens from 1855 to 1865. On the death of Sir William in the latter year, Sir Joseph became director and held the position until 1885. Sir Joseph was president of the Norwich meeting of the British Association in 1868. His presidential address on that occasion is still famous for its championship of the Darwinian theory. Indeed it was Sir Joseph Hooker and Sir Charles Lyell, both early and intimate friends of Darwin, who induced him to place his views before the world. Sir Joseph was a member of the Erebus and Terror expedition to the Antarctic regions. He returned therefrom in 1843 with 5,340 botanical specimens. In 1847 he undertook a three years' expedition to the Himalayas, again making a very large collection of plants. Morocco saw him in 1871. His chief exploit there was to ascend the great Atlas, the summit of which was never reached before by a European. Once more he brought back a valuable collection of botanical specimens.

Colonel Prain's immediate predecessor in the directorship of Kew was Sir W. T. Thiselton-Dyer, who married a daughter of Sir Joseph Hooker, and who in 1895, at Ipswich, was president of the Botanical Section of the British Association. From 1759 to 1841, in

which latter year Sir William Hooker became the first director, Kew Gardens were a portion of a royal residence. George III. was confined at Kew during his spells of madness. Since 1841 the Gardens have been devoted chiefly to botanical research, and are probably the finest of their kind in the world. They are also a favorite holiday haunt. Among other attractions of the gardens are the following; A wild part with bracken, wild flowers, and woods; a group of greenhouses massed with flowering plants; an orchid house, a water lily house, a tropical house, an American garden, an arboretum extending in walks and avenues down to the Thames, a large palm house and a winter garden. Small ornamental temples are scattered about the gardens, and a curious pagoda is a landmark for many miles around. Kew Gardens increase the troubles of David Lloyd-George, chancellor of the exchequer, by about $150,000 per annum.

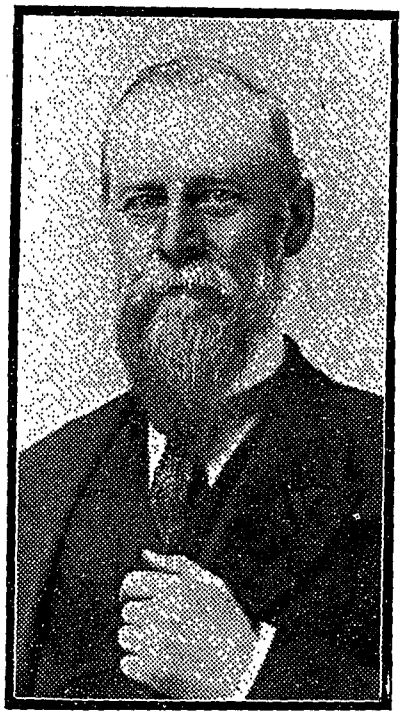
Born in Scotland in 1857, Colonel Prain was educated in the parish school of Fettercairn, Kincardineshire. From there he went to Aberdeen Grammar School, and proceeded later to the Universities of Aberdeen and Edinburgh. He was demonstrator of anatomy in the College of Surgeons, Edinburgh, in 1882-3, and in the University of Aberdeen in 1883-4. In the latter year he entered the Indian Medical Service, and was curator of the Calcutta herbarium from 1887-1898. He left the herbarium to become director of the botanical survey of India, and superintendent of the Royal Botanical Garden, Calcutta, which position he held until 1905. For ten years, from 1895 to 1905, he was also professor of botany in Medical College, Calcutta. In 1903-4 he was secretary of the board of scientific advice for India, and from 1898-1904 he was trustee of the Indian Museum. A few weeks ago Professor Buller, of Manitoba University, had the pleasure of meeting Colonel Prain at Kew. He described the colonel as a bright, level-headed, pleasant mannered man, and one who will undoubtedly make an excellent president of the botanical section. Colonel Prain was kind enough to promise to send some of the Kew publications to the library of Manitoba University. Among such publications is an important monthly known as the Kew Bulletin.

Through his previous career Colonel Prain was eminently fitted to take over the directorship of Kew Gardens. His lengthy sojourn in India and his visit to South Africa have proved of inestimable value in his work. Colonel Prain is a specialist in what is known as systematic botany. It may be explained that until comparatively recent years all botany was systematic botany. A botanist was a man who could tell the names of plants and classify them correctly. Now, however, botany is a complex study. There is structural botany, physiological botany, fossil botany, ecological botany, histological botany, which deals with the tissues of plants and cytological or cellular botany. Colonel Prain is an authority on nomenclature, part of his work being to identify and describe new species sent to him from all parts of the world. He also superintends the cultivation at Kew of thousands of these species. He has written voluminously upon the cotton plant, the different varieties of which have been a source of much controversy to botanists. It is very necessary that the classification of plants should be in the hands of able men, as the ready naming of botanical specimens means a great saving of time to those who are engaged in other branches of the science.

MAJOR PATRICK GEORGE CRAIGIE, C.B.

President of Section K1.—Agriculture.

An evidence of the catholic spirit permeating the British Association for the Advancement of Science is furnished by the creation in view of the Winnipeg meeting, of a special section of agriculture. This section, which has received the designation K1, will be



presided over by the subject of this sketch, Major Patrick George Craigie, C.B. There is every probability that the new section will remain a permanent department of the British Association, and should this be the case Winnipeg will have had the honor of leaving a permanent impression upon that learned body. It may not be out of place here to remark that special effort is being made to interest the western farmers in this special section. With this object in view the secretaries of the agricultural societies and farmers' institutes throughout the west are being communicated with. It may also be mentioned that some 200 of Winnipeg's distinguished visitors will be shown the western wheat fields and no doubt they will have an opportunity of seeing harvesting operations in full swing.

Major Craigie, like Professor Herdman, the subject of last week's sketch, is not a stranger to western Canada. In 1884 he carried out, on his own initiative, and in an unofficial capacity, an extensive investigation on this continent into the future of the meat supply of Great Britain. On this trip he visited, among other parts, the ranching districts of the Canadian Northwest, where he is still remembered by many. By birth Major Craigie is a Scotchman, for he was born at Perth in 1843, but for the past 30 years he has been identified with matters agricultural and statistical in England. From private tutors and the old Perth Academy, he proceeded to Edinburgh University, where he became one of the two prizemen of his year in the agricultural class, a department established in the eighteenth century, and many years before instruction of this type became a recognized thing in the other academic institutions of Great Britain. From 1863 to 1864 Major Craigie studied at St. Catherine's College, Cambridge. He had in the meantime entered upon military duty, joining the Royal Perth militia in 1861, a corps which became later the 3rd Battalion Royal Highlanders and known as the celebrated "Black Watch." In 1882 he retired after 21 years' military service. From 1865 to 1868 Major Craigie was in charge of landed estates in the north riding of Yorkshire. In the management of this property he was able to utilize his experience in practical agriculture gained in Scotland. For one year during this trust he had the unique experience of being the sole inhabitant occupier of a small Yorkshire parish, which afforded him an insight into the working of agricultural economics and questions of local taxation in England. For 18 years from 1871 he was secretary of the local taxation committee appointed under the presidency of Sir Massey Lopes to secure the attention of the government of the day to the grievances of the rate-paying class. For the latter ten years of this period he also held the position of secretary to the Central Chamber of Agriculture.

On the creation in 1889 of the board of agriculture as a separate department of the government Major Craigie became one of its officers and remained with it in different capacities, formal and informal until 1906. From time to time he has been entrusted by the

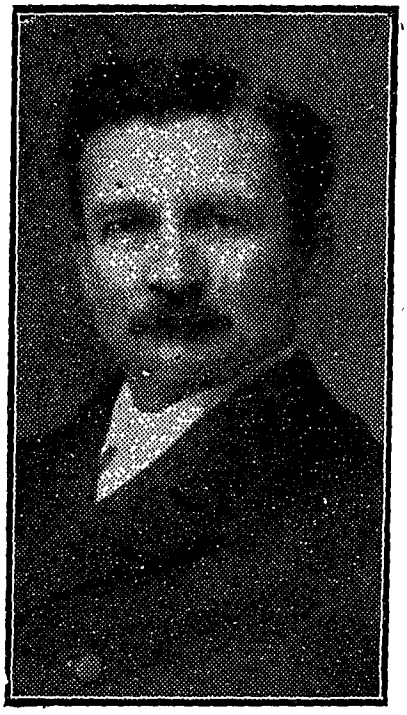
British Government with missions abroad and these have given him unrivalled opportunities to acquire an intimate knowledge of the conditions of foreign agriculture. In 1887 he undertook an official inquiry on behalf of the agricultural department of the Privy Council into the organization and working of the agricultural schools of France, while a second visit was paid to that country in 1891 with the same object in view. His reports on this matter materially influenced the subsequent arrangements for the provision of state-aided agricultural instruction in Great Britain. In 1888 he conducted an investigation into the market systems of Paris and Bruxelles for Lord Derby's commission on market rates and tolls. In 1893 he paid a second visit to the States—the first visit, already mentioned, was in 1884—to inquire into the agricultural experimental stations and colleges of that country.

Major Craigie has been an official delegate of Great Britain at each of the successive congresses of the International Statistical Institute. These missions have entailed visits to Rome, 1887, Paris 1889 and 1909, Vienna 1891, Chicago 1893, Berne 1895, St. Petersburg 1897, Christiania 1899, Buda Pesth 1901, Berlin 1903, and Copenhagen 1907. His formal entry into the ranks of the civil service dates, however, only from 1890, when he was selected by the Salisbury government of the day as director of the statistical, intelligence and educational department of the board of agriculture. In 1897 he was promoted to be assistant secretary of the board. During both these terms of office he was intimately connected with the organization of the technical education inaugurated by the government. In recognition of his services to the board of agriculture, the title of C. B. (Companion of the Bath) was conferred upon him by the King on the occasion of the coronation. In 1902 Major Craigie had the distinction of being elected to be president of the Royal Statistical Society, having been a fellow of the society since 1874. He was president of the economic Science and Statistical section of the British Association at its meetings in Bradford in 1900. In 1906 he retired from the assistant secretaryship of the board of agriculture and became Gilbey lecturer on the history and economics of agriculture at the University of Cambridge. Major Craigie has made numerous contributions to the literature of agriculture, local taxation, agricultural education and the food supply of Great Britain.

REV. HERBERT BRANSTON GRAY, D.D.

President of Section L.—Educational Science

Quite as inseparable as Rome and the pope are the names of Bradfield College, Berkshire, and Rev. Herbert Branston Gray, who has been appointed president of the Educational Science section for the Winnipeg meeting of the British Association. The history



of Bradfield College is largely the history of Dr. Gray. For 29 years he has been its headmaster, forming a remarkable instance of what can be achieved through the personality of one man. When Dr. Gray went to Bradfield College as its headmaster the fortunes of the institution were at the lowest possible ebb. Masters were clamoring for arrears of salary and the number of pupils was decreasing with alarming pesistency; in short blue ruin confronted the old historic foundation of Bradfield. The advent of Dr. Gray acted like a charm. He faced the situation with a wonderful daring, and through sheer ability accomplished what the "Guardian" called a veritable resurrection from the dead." When Dr. Gray arrived on the scene the number of pupils had dwindled to 53; in 1893 it had risen to 200 and is now nearly double that number. He has not only infused every department of the college with his indomitable energy, but has also from time to time introduced features which have called forth admiring comment in scholastic circles.

The Greek theatre at Bradfield has attracted the attention of the whole literary world. It may be mentioned that the production of "Agamemnon" in the original Greek at Oxford in 1880, with F. R. Benson, the famous Shakespearean actor, as Clytemnestra, had revealed to the English public the power of the plays of Aeschylus. As a result a tremendous enthusiasm had been aroused for the Greek drama. Dr. Gray resolved to attempt a like success at Bradfield College and he selected for his experiment the "Alcestis" of Euripides. The performance took place in March, 1882, with F. R. Benson as stage manager, and was most successful. A few years later, in 1888, Dr. Gray conceived the bold idea of converting an old and disused chalk pit, just outside the college grounds, into a Greek theatre on the model of those existing in the palmy days of the attic drama. With the aid of the boys, and afterwards with the help of professional workmen, he cut into the solid chalk ten tiers of seats, shaping the orchestra on the model of that at Epidaurus in the Peloponnesus. The seats are concrete-covered to represent the classic bareness of stone, but their hardness is mitigated by cushions handed to the spectators as they proceed to their seats. The tiers occupy three-fourths of the circle, the remaining fourth being taken up by the stage.

The flat, circular space enclosed forms the dancing stage and in the centre of it is the altar of Dionysius, a reminder that all dramatic art had its origin in religion. At the back of the stage is a permanent scene representing the exterior of a Greek building, that of the royal palace of Argos. This form of theatre was specially chosen by Dr. Gray because it represented the only one on the mainland of Greece which has escaped the alterations introduced by the Romans. Under these unique conditions Bradfield College produced in 1890 its first open-air Greek play, the "Antigone" of Spohocles. Not since the downfall of the Greek stage had a Greek drama been produced under conditions exactly identical with those of ancient times. All the players and

all the chorus were either Bradfield masters or boys. Dr. Gray himself played the part of Coryphaeus. Other important developments instituted by Dr. Gray have been the establishment of an engineering class, of army and navy classes, of a rifle corps and of choral singing.

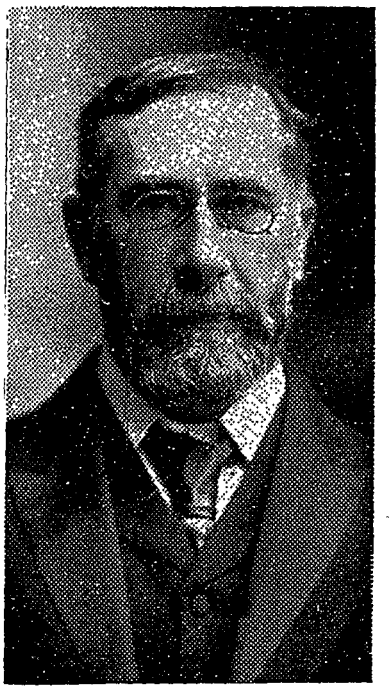
It need hardly be said that Dr. Gray has taken a prominent part in the educational controversies of the United Kingdom. He is a member of the Incorporated Association of Headmasters, at whose meetings his voice is often heard, and he acted as chairman of the National Defence Committee of this Association from 1905-1908. He is also a member of the Headmasters' Conference. Dr. Gray is a familiar figure at the Church Congress, to which he read papers on educational subjects at the Reading, Brighton, Bristol and Barrow-in-Furness meetings. Dr. Gray is furthermore an author of some note. His chief contributions to literature are "Modern Laodiceans" and "Men of Like Passions." He has also published a number of hymns, sermons and articles and he is the joint author of the Westminster Ovid.

Dr. Gray was born in 1851 and is the son of Thomas Gray, of Orlebar House, St. Peter's, Isle of Thanet, and of Orlebar, Old Charlton, Kent. A lawsuit connected with this property is supposed by some to be the lawsuit upon which Charles Dickens founded the famous case of Jarndyce versus Jarndyce in "Bleak House." At Winchester College, where he received his early education, Dr. Gray was dubbed "The Pocket Hercules" from the size of his muscles and his moderate stature. From Winchester he went to Queen's College, Oxford, with a scholarship. After a brilliant academic career Dr. Gray became a master at Westminster School, where, among other things, he established a friendship with Dean Stanley. He remained at Westminster School for three years and then for two years was headmaster of Louth Grammar School, Lincolnshire. From there he went in 1880 to Bradfield College. Dr. Gray, as will have been noted, has taken holy orders. He took the degree of bachelor of divinity and doctor of divinity at Oxford in 1892 by accumulation, having been ordained deacon in 1877 and priest the following year by the then Bishop of London.

PROFESSOR WILLIAM ABBOT HERDMAN, F.R.S.

General Secretary.

Professor William Abbot Herdman, who, since 1903, has been a general secretary of the British Association, is a leader in the band of younger biologists, who, during the past quarter of a century, have placed biological research in Great Brtiain in the front rank. He is one of the most famous of living marine biologists.



Professor Herdman has been professor of Natural History in the University of Liverpool since 1881. He is of Scotch descent, and was born in Edinburgh. His father was at one time a distinguished member of the Royal Scottish Academy. The professor was brought up in his native city, having been educated at the Edinburgh Academy, and subsequently at the University, where he graduated in 1879. He acted as assistant to Sir Wyville Thomson in the "Challenger" expedition Office, and took up the study of zoology, which has since distinguished him. A year after his graduation he was appointed Demonstrator in Zoology at the Edinburgh University. In 1895 he acted as president of the Zoological Section of the British Association, and in 1904 he was elected to the presidency of the Linnean Society. He has taken the greatest interest in the practical part of zoological study. He took the principal part in the establishment of the Marine Biological Station at Port Erin, Isle of Man, and of the Sea Fish Hatchery at Piel, near Barrow. He is an Honorary Director of Scientific Work to the Lancashire Sea Fisheries Committee. Professor Herdman had the honor of being selected by the British Government when they desired an investigation into the Pearl-Oyster Fisheries in Ceylon, and he spent a considerable time in 1901-2 on the thorough carrying out of this work. His report, which was issued in 1903, was considered a notable addition to the literature on this part of zoology. His selection by the Government, was, no doubt, partly due to the fact that he had already published in his "Oysters and Disease" the results of a careful and elaborate study of the subject. At the marine biological stations with which he is connected Professor Herdman has always made a prominent feature of practical instruction. Large numbers of fishermen have enjoyed courses of instruction in fish habits and fish breeding at these institutions, with the most beneficial results.

The professor is no stranger to Canada. Doubtless he has already seen something of Winnipeg; at any rate he has passed through the city several times on his visits to his brother, the well-known Alpine climber, Rev. J. C. Herdman, D.D., of Calgary. At the meeting of the British Association held in Toronto in 1897 Professor Herdman took a prominent part. He is an excellent linguist and in his idle moments something also of a comic sketcher. Many of his Canadian friends have received his original Christmas cards. In one of these "Our Lady of the Snows" was depicted melting before the mid-day sun with the Indians in feathers and war paint tumbling across the prairie to her rescue. Professor Herdman is a man of most active temperament, being a keen oar and cyclist, and a good walker. His particular hobby is early archaeology, on which he is something of an authority.

At the Winnipeg meeting of the Association Professor Herdman will deliver the second evening discourse, his subject being, "Our Food from the Waters."

DR. A. E. H. TUTTON, F.R.S.

Evening Lecturer

A delightful scientific treat is in store for those who will be lucky enough to hear Dr. Tutton's discourse in the Walker theatre on August 26 on "The Seven Styles of Crystal Achitecture." Evening discourses are an old-established institution of the British As-

sociation. They were commenced as long ago as 1843 at the Manchester meeting of that year and they have continued down to the present without a break. A distinction is made between evening discourses and popular evening lectures. It is the object of the evening discourses to provide occasions on which all the members of the Association can meet to hear a scientific disquisition on some topic of general interest. Although of a popular nature, the evening discourses are as a rule, usually a little more learned than the evening popular lectures. In the long list of discourses delivered to the Association appear the names of practically all the great British scientists. At Montreal in 1884, Prof. Oliver Lodge discoursed on "Dust," and Rev. W. H. Dallenger on "The Modern Microscope in Researches on the Least and Lowest Forms of Life." At Toronto in 1887 Prof. W. C. Roberts-Austen discoursed on "Canada's Metals," and J. Milne on "Earthquakes and Volcanoes."

Some excellent Winnipeggers have imagined from the title of Dr. Tutton's lecture, "The Seven Styles of Crystal Architecture," that the latter will deal with the art of glass cutting, while others have conjured up visions of crystal palaces. It is not precisely with either of these themes that Dr. Tutton will deal, yet nothing that has been conceived, concerning the lecture, in the way of beauty, or of interest, is likely to surpass the "rainbow visions" which Dr. Tutton will cause to rise.

Since 1895 Dr. Tutton has been inspector of technical schools under the board of education of the British Government. He was born at Stockport, near Manchester, in 1864. A distinguished academic career began at Owen's College, now the University of Manchester, where he studied under the famous chemist, Prof. Sir Henry Roscoe. Gaining an exhibition at the Royal College of Science, South Kensington, he proceeded thither in 1883 and after studying there for three years he became assistant in chemistry at the College and later demonstrator and lecturer in the same subject. Dr. Tutton is entitled to write a large number of letters after his name, among them being the coveted trio, "F.R.S.," a distinction he received in 1899. Last year he was elected to the council of the British Association. He is a member of the Chemical Society of London, a fellow of the Physical Society of London, and a fellow of the German Chemical Society. Dr. Tutton has published a large number of memoirs of original investigations in chemistry and in chemical and physical crystallography.

In explanation of Dr. Tutton's lecture, the following notes, kindly supplied by Prof. Frank Allen, of Manitoba University, who will assist Dr. Tutton in the illustration of his lecture, may be of interest. Nearly all substances, when slowly solidifying from the liquid state, assume symmetrical shapes known as crystals. Common examples of these are quartz, alum, and sugar in the form of rock candy, but there are hosts of others not familiar to the layman. Close study has shown that all forms of crystals may be classed under a very few systems, for though their shapes may vary widely, the essential characteristics may be precisely the same. This fact has greatly facilitated the study of crystallography, which has become one of the most highly developed branches of

science. Crystals may be studied with reference to their power of conducting heat or by the manner in which rays of light pass through them. In general a ray of light will go through a crystal in different manner for different positions of the crystal. This remarkable property is by far the most interesting method of studying the properties and molecular structure of crystals.

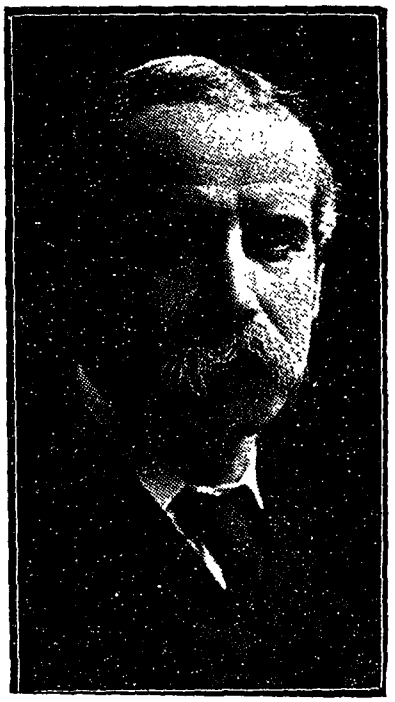
A crystal known as Iceland spar will divide a single ray of light into two, so that on looking through such a crystal, one sees objects double. This property is also possessed by quartz and other minerals. In order to demonstrate the architecture of crystals the light from an electric arc must be polarized, which means that the ether waves which constitute light, are made to vibrate exactly parallel to each other. Iceland spar possesses the power of polarizing light and this natural property is taken advantage of in constructing what are called polariscopes. The latter consist of two similar sets of crystals of Iceland spar called polarizer and analyzer. When a section of crystal is placed between polarizer and analyzer, so that the light passes through all three, a series of beautifully colored rings of light can be projected on a screen, just as a lantern slide is projected. These rings assume various regular but fantastic shapes as the crystal is rotated. Every crystal gives its own peculiar rings and colors.

The object of Dr. Tutton's lecture is to explain the molecular architecture of crystals and to show by experiments the peculiarities of the various types of crystals. For this purpose Dr. Tutton is bringing with him a pair of Iceland spar crystals of very large size. This in itself is very noteworthy owing to the extreme scarcity of large crystals of this now most valuable substance. Dr. Tutton has taken great trouble to secure sections of various crystals of great size and purity in order to demonstrate their structure on a large scale. This will permit the audience in the Walker theatre to see readily the characteristics of the crystals. The valuable polariscope of the physical department of Manitoba University will probably be utilized for the purpose of Dr. Tutton's discourse.

PROFESSOR HAROLD BAILEY DIXON, F.R.S.

Popular Evening Lecturer.

At its Dundee meeting in 1867 the British Association inaugurated what has since developed into one of its most pleasing features, viz.; the delivery of popular evening lectures free to the general public. In this connection Winnipeg is again being favored,



for instead of one such lecture, as is the rule, two popular lectures will be delivered in the Walker theatre during the Association's meeting. The Association attaches great importance to these lectures, regarding them as a kind of outward and visible sign of the bond between the scientifically uninstructed public, which it aims to serve, and its own learned deliberations. Some of its most distinguished members have been heard at these popular gatherings. The very first lecture of the series was, in fact, delivered by none other than the great Professor Tyndall, whose theme was "Matter and Force." In the following year Prof. Huxley lectured to the citizens of Norwich on "A Piece of Chalk." Further down the list are to be found such names as those of Sir John Lubbock and Sir Robert Ball. Last year, at Dublin, Prof. H. H. Turner, of Oxford, lectured on "Halley's Comet," which is due to appear next year.

At the Winnipeg meeting one of the popular evening lecturers will be Prof. Harold B. Dixon, F.R.S., professor of chemistry at the University of Manchester, who, on Monday, Aug. 30, will deliver a popular lecture on "The Chemistry of Flame." Prof. Dixon, who was born in 1852, is the second son of the late William Hepworth Dixon, a distinguished writer and traveller, and editor, from 1853-1869, of the "Athenaeum." After carrying off high honors at Oxford and also studying at Heidelberg University, Prof. Dixon lectured at Oxford for several years on natural science. In 1886 he succeeded the great chemist, Sir Henry Roscoe, in the chair of chemistry at what was then Owen's College, but is now the University of Manchester. He has occupied this chair ever since. From 1891-1894 he had the distinction of sitting on the Royal Commission appointed by the British Government to inquire into explosions of coal and dust in mines and from 1902-1905 he sat on the Royal Commission on coal supplies. There are few living scientists more distinguished than himself in the domain of flame chemistry. A few years ago he received the high honor of being asked to address the Chemical Society of Berlin on his researches on that subject and was the guest in Berlin of the great German chemist, Emil Fischer. From Professor Dixon emanated very largely the impulse given in recent years to investigations into the influence of moisture on chemical change. He found that a number of chemical changes, such as those which ordinarily take place when phosphorous is burned in air or when carbon monoxide and oxygen are exploded, do not occur if there is an entire absence of moisture. These results, which have been elaborated by Prof. Dixon's pupils and other investigators, were partially foreshadowed by his work on the exploding of carbon monoxide and oxygen. Prof. Dixon was recently elected president of the London Chemical Society, one of the most distinguished bodies of its kind in the world.

Prof. Dixon has been a frequent visitor to Canada. He has one very strong link with the Dominion, for he married in 1885, Olive Beechey, daughter of the late Edward Martin Hopkins, of Montreal. Mrs. Dixon is a

god-child of Lord Strathcona. His beautiful home in Victoria Park, Manchester, is called Beechey House after Mrs. Dixon. On its walls are many beautiful pictures of Canadian scenes, while in its nooks and corners are all kinds of Canadian souvenirs. The professor's knowledge of Canada extends to the west, for he visited Winnipeg in the seventies with his father. Later on he bought Winnipeg real estate, which, like some of the real estate bought in the early days, obstinately refused to do the thing expected of it. But the professor has long ago forgiven Winnipeg for that, and when he visits Winnipeg this summer he will see that his confidence in the future of the city was not misplaced.

As an Alpine climber Prof. Dixon has achieved much distinction. For many years past it has been his favorite hobby. As a young man at Oxford he had the honor of playing in the University football eleven. He has spent many summers among the Swiss Alps, crossing glaciers and scaling chimneys. It was in Switzerland that the professor met Philip Abbot, the story of whose tragic death was told not long ago in the columns of the Free Press. It may, however, be briefly recounted here, in view of Prof. Dixon's connection with the story. Philip Abbot, a young American of much promise, was an enthusiastic Alpinist. After a chance meeting with Prof. Dixon in Switzerland in 1892 the two planned to do some climbing the following year in the Canadian Rockies. Two years passed without the plan maturing, but in 1895 definite arrangements were made to climb Mount Lefroy, in Paradise Valley, one of the giants of the Rockies. At the last moment Prof. Dixon was prevented from joining the party, but young Abbot, with some members of the Appalachian Mountain Club, went to the Rockies. When near the summit of Lefroy, Abbot loosed himself from the rope and attempted to climb a dangerous cleft in a rocky buttress which barred the way. The poor fellow slipped and fell a thousand feet. He was found unconscious, but still alive, by his friends. His skull, however, had been fractured and he died while being carried down the mountain. The following year at the request of Abbot's father, who was anxious to have the disaster cleared up as far as ever possible, a party of British and American climbers, including Prof. Dixon, set out for Lefroy. They conquered the peak on Aug 3, 1896, exactly one year after the tragedy.

Prof. Dixon is a member of the Alpine Club of Canada and it is interesting to note that previous to the meeting of the British Association in Winnipeg he will undertake a climbing tour in the Rockies.

PROFESSOR JOHN HENRY POYNTING, F.R.S.

Popular Evening Lecturer

"He's little, but he's wise," is a phrase which may aptly be borrowed from Rudyard Kipling to describe Professor Poynting. He is a cheery little man and a brilliant scientist. Great physicists have already appeared in this series of sketches and with them Profes-

sor Poynting is worthy to rank. As a matter of fact he is at the present time collaborating with Professor Sir Joseph John Thomson in a standard text book of physics.

At the Winnipeg meeting of the British Association Professor Poynting will deliver in the Walker theatre on Sept. 1 one of the two popular evening lectures, taking as his subject, "The Pressure of Light." The scope and intention of these lectures has already been explained and it has been pointed out that Winnipeg, in having two such lectures, is specially favored.

At the time of the discovery of the X-rays by Professor Roentgen, of Wuerzburg University, Professor Poynting delivered an evening popular lecture on the subject to the Birmingham Philosophical Society. All present carried away with them a vivid impression of the subject, of which Professor Poynting had given a brilliant historical account. Professor Poynting has established the reputation of being kind to students and genial with colleagues.

Born near Manchester in 1852, Prof. Poynting is the son of a Unitarian minister, at whose private school he received his early education. Later he studied at Owen's College, now the University of Manchester, and later still at Trinity College, Cambridge. He became a fellow of that college in 1878. His life's work has been done at Mason University College, Birmingham, which he entered as professor of physics in 1880. He has seen the institution grow into the University of Birmingham, of which he is now dean of the faculty of science.

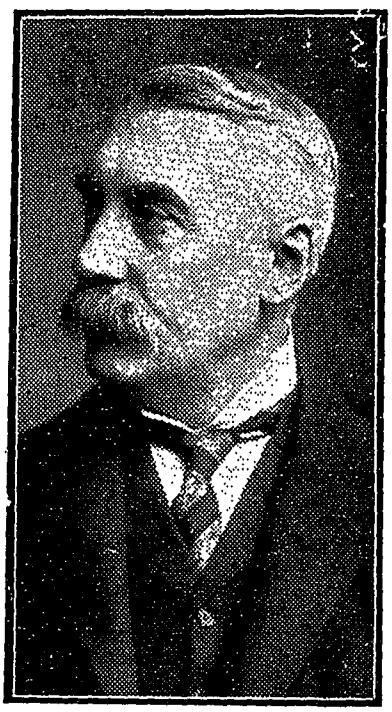
One of Prof. Poynting's distinctions was the winning of the Adams prize in 1891. This prize was instituted by the University of Cambridge in honor of J. C. Adams, who is famous as the discoverer of the planet Neptune by mathematical deduction from the law of gravitation before the planet was actually seen by the telescope. Adams stated its exact position and all data concerning it. An extremely interesting piece of work performed by Prof. Poynting was the weighing of the earth by means of an ordinary balance. Expressed in more scientific language he determined the average density of the earth, including rocks, atmosphere, water and all that goes to make up its bulk. At University College, Birmingham, Prof. Poynting attempted to weigh the earth by means of a pendulum hung from the top of the building down the area formed by the stairway. Prof Poynting's mathematical work in electriciy, though not of a popular nature is of very great importance to scientists.

The professor has done much work in collaboration with Professor Sir Joseph John Thomson, who will be president of the Winnipeg meeting. The two scientists have been friends for many years past. In 1899, at the Dover meeting of the British Association, Professor Poynting was the president of the physics and mathematical science section. He obtained the medal of the Royal Society in 1905. In recognition of his civic sense he has just been created a justice of the peace.

MAJOR PERCY ALEXANDER MACMAHON.

General Secretary

In Major MacMahon are happily combined the handsome presence of the soldier and the trained mental outlook of the man of science. Since 1902 the major has been one of the two general secretaries of the British Association, upon whose shoulders falls a



large part of the Association's work as well as much of the responsibility for its general policy. An important function with the British Association, and one which will commend itself to all who take even a casual interest in the progress of science, is the granting of money for the purposes of scientific research. Since its inauguration in 1831, the Association has granted for this purpose no less a sum than $360,000. As an example of this branch of the Association's work it is interesting to note that for four years past some of the Winnipeg members have been carrying on an investigation into ductless glands. The local members of the committee which is doing this particular research work are: Mrs. W. H. Thompson, Professor Swale Vincent, Dr. F. A. Young, and Dr. J. E. Lehmann. A report of their work was presented to last year's meeting of the Association at Dublin and a further grant of $175 was secured for the continuation of the work.

It may not be out of place to mention here that according to its constitution the objects of the British Association are the following: "To give a stronger impulse and a more systematic direction to scientific inquiry, to promote the intercourse of those who cultivate science in the different parts of the British Empire, with one another and with foreign philosophers, to obtain a more general attention to the objects of science, and a removal of any disadvantages of a public kind which impede its progress." Too much emphasis cannot be placed upon this open avowal of the Association that its sphere is the whole of the British Empire and further that it seeks intercourse with the scientific men of other countries.

In being born on the Island of Malta in 1854, Major MacMahon, like many a soldier's son, saw the light beyond the confines of his fatherland. He was educated at Cheltenham College and later at the Royal Military Academy, Woolwich. He entered the Royal Artillery in 1872, and was instructor at the Royal Military Academy from 1882-1888. Then from 1890-1897 the major was professor of physics in the Ordnance College. Since 1896 he has been deputy warden of the standards board of trade at its well-known headquarters in Old Palace Yard, London. Major MacMahon has received a large number of academic honors and scientific distinctions. From 1894-1896 he was president of the London Mathematical Society. The degree of Doctor of Science, honoris causa, was conferred upon him by Trinity College, Dublin in 1897, and the same degree was given to him by the Cambridge University in 1904. In 1900 he was awarded the medal of the Royal Society. At the Glasgow meeting of the British Association in 1901 Major MacMahon presided over the mathematical and physical science section. He has published numerous papers on pure mathematics. Two years ago the major married the daughter of the late C. R. Howard, of London.

PROFESSOR JOHN PERRY, F.R.S.

General Treasurer.

Professor Perry has climbed the scientific ladder from lowest rung to topmost round. He is today one of the greatest of living mechanical engineers, and in the teaching of engineering mathematics he has created something of a revolution. What educationists have not heard of the "Perry

movement?" Born at Garvagh, Ireland, in 1850, of Scotch-Irish parentage, a combination par excellence for the breeding of virile stock, the youthful Perry spent the first ten years of his life upon a farm. Then he went to school in Belfast, where a caning became his daily portion, as he could not, or would not, prepare his lessons. However, the canings suddenly ceased when he gained a silver medal for proficiency in natural science in competition with boys many years older than himself. At the age of 14 young Perry took a position as apprentice in the drawing office and pattern shops of a foundry near Belfast. He attended night schools and after gaining a number of prizes, went, in 1868, to Manchester on the chance, poor enough as it seemed, of gaining an exhibition. He gained the exhibition and matriculated at Queen's College, Belfast, the same year.

In 1870 young Perry graduated in the then Queen's University of Ireland as bachelor of engineering, gaining many honors, a gold medal and several money prizes in the meantime. Working at college during the winter he spent the summers in the fitting and blacksmiths' shop of the foundry, where he had served his apprenticeship. The next four years he spent as assistant master in physics at Clifton College, where he built the first school physics laboratory to be erected in England. We find Perry in 1874, when but 24 years of age, one of the secretaries of the Mathematical and Physical Science section of the British Association. The same year he became Thomson scholar at Lord Kelvin's laboratory, Glasgow, acting as the latter's assistant till 1875, when he left Great Britain for Japan. There for four years, from 1875-79, he taught civil engineering at the Imperial College of Engineering of Yeddo.

On his return to England he devoted himself to inventing and to giving expert advice in electrical engineering. At Westminster, among other things, he superintended the reorganization of an engineering establishment where he introduced large tools, and machinery for covering wire with gutta percha. In a lecture to the Society of Arts on "The Future Development of Electrical Appliances," he first pointed out the importance of burning fuel as zinc is burnt in a voltaic cell. He also described a method of transmitting the images of moving objects electrically through wires. The lecture contained many other remarkable suggestions, some of which have since been carried into practical use. In 1881 he arranged the system of examination in mechanical engineering of the city and Guilds of London Institute. In the following year he became professor of applied mechanics and engineering in the City and Guilds of London Technical College, Finsbury. He held that position until 1896.

In 1896 Professor Perry received his present appointment, that of professor of mechanics and mathematics in the Royal College of Science, South Kensington. Here he is chairman of examiners in the seven engineering subjects and as such controls the studies of some 100,000 students. He has also examined at other universities, in fact he has examined and taught every kind of student: gilded youths and the sons of the poor, apprentices, working men and Japanese students. Some of

his pupils are now cab-drivers, while others are high in the councils of the British Empire. Professor Perry has lectured to thousands of fashionably-dressed men and women and he has lectured to thousands of workingmen. He has spoke at vigorously contested elections. He has lived and worked with artisans as one of them and also with leisured scientific people as one of them. He has published a large number of text books and scientific monographs.

What is known as the "Perry movement in educational methods originated with a paper on the teaching of mathematics read by Professor Perry at the Glasgow meeting of the British Association in 1901. In that paper Professor Perry maintained that usefulness should be the criterion for determining what subjects should be taught to children and in what way they should be taught. He believed that boys might not only become skilful in the use of logarithms, algebraic formulae, square paper, calculus, etc., but that they might be so taught as to learn to use those things with pleasure. Professor Perry also asserted that men who taught orthodox mathematics were not only destroying what power to think existed, but were also producing a dislike and hatred for all kinds of computations, and, therefore, for all scientific studies of nature. As the basis of his belief that instruction in elementary mathematics should be more practical, Professor Perry stated that, "In the whole history of the world there was never a race with less liking for abstract reasoning than the Anglo-Saxon. Every other race has perfected abstract schemes of government. Here common sense and compromise are believed in; logical deductions from philosophical principles are looked upon with suspicion, not only by legislators, but by all our most learned professional men."

Professor Perry lays emphasis upon the following propositions: (1) Experimental methods in mensuration and geometry ought to precede demonstrative geometry, although even in the earliest stages some demonstrative reasoning may be introduced. (2) The experimental methods adopted may be left largely to the teacher. (3) Decimals ought to be used in arithmetic from the beginning. (4) The numerical solution of complex mathematical expressions may be taken up almost as a part of arithmetic, or the beginning of algebra, as it is more useful in familiarizing pupils with the meaning of mathematical symbols. (5) Logarithms should immediately follow the theory of exponents. (6) The study of the calculus may precede advanced algebra, advanced trigonometry, or analytical geometry, and may be illustrated by any quantitative study in which the pupil may be engaged. The reforms proposed by Professor Perry were widely discussed and were in general favorably received. It was not to be expected, however, that the traditional teaching of Euclid in Great Britain would undergo any immediate or radical change. In the United States Professor Perry's views have found general acceptance and have been carried more or less completely into effect. But even in the States the "Perry movement" has been subjected to much criticism. Professor George Bruce Halsted, of the Colorado State Normal School, a prominent mathematician, holds strongly, for instance, to the view that mathematics should be taught from the outset as a formal training in rigorous thinking.

Since 1904 Professor Perry has been general treasurer of the British Association. In this capacity he has had much to do with administration, policy and the grants for research work. His scientific zeal is infectious. He is a tower of strength in the great parliament of science, in sectional debates as well as in the deliberations of the executive council.

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